

## Goddard Higher Education

# outlook

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Issue 1 December, 2005

## Message from the Chief of Higher Education

It is a pleasure to welcome the reader to the Higher Education Outlook (HEO).

Some ask “Ye gods, why yet another newsletter?” Our response, in semi-perfect harmony is “Why not?” Our objective with this publication is to give the interested (or just polite) reader a quick picture of current programs, events, and future plans, in higher education at Goddard. We want to make the excitement and drama of higher education come alive. We have set ourselves the goal of not being terminally dull. We also need to be economical since this is a tight budget year (unlike all the other years?). We are therefore using recycled ink on the paper version and previously owned electrons on the web version. And with both, we are asking people to read between the lines.

An important highlight of this first HEO issue is a statement on diversity by Dillard Menchan. Menchan was head of Goddard’s Office of Equal Opportunity and its Minority University Programs Office (now mostly incorporated into our new Higher Education Office) for over a decade, giving him an opportunity to report to himself—on a regular basis. He has since left both roles to become Deputy to the Goddard Education Officer, working full time on the full range of NASA education issues.

We are eager for reader feedback. We have not decided whether, or at what intervals, further issues of HEO should be produced. We note the attraction of having a vehicle with which to compete for a Pulitzer in investigative journalism, but think we should not base our decision on that possibility. Tell us what you think. Compete for any prize that may be given to people who correctly identify which of the items under “*Experimenting on Humans*” are fictional. Apply to the programs. Join the excitement!

*Vic Teplitz*

[www.nasa.gov](http://www.nasa.gov)



## Student Intern Program (SIP)

The NASA Student Intern Program (SIP) just completed its 2005 summer session. In this innovative program, undergraduate and graduate students interested in careers in aerospace-related fields team with a Principal Investigator (PI) for experience in cutting-edge research here at Goddard.

SIP students heard speakers from all over NASA ranging from scientists and engineers to meteorologists and astronauts. Program participants were also involved in weekly Scientific Colloquia, cookouts, and planned weekend trips to beaches, Times Square in New York City, etc.

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## Diversity Strategy Dillard Menchan

Over the past two decades, Goddard Space Flight Center (GSFC) has successfully implemented several strategies to broaden the pool of students who have the opportunity to participate in an internship experience here. This has resulted in a notable increase in the number of under-represented minorities and people with disabilities in the Center's employment pipeline. The use of our Cooperative Education Program has provided a vehicle for many interns to return to Goddard during the school year. This opportunity allows students to become intimately involved in space flight projects or other job experiences, which often has led to permanent position offers.

GSFC Director, Dr. Ed Weiler, has stated, "Diversity of workforce is a source of creativity that strengthens our programs and enhances our competitive advantage." In fact, there is ample literature that clearly suggests that successful contemporary management strategies embrace diversity initiatives when the workplace methodology is group-based and team oriented as is the case at GSFC.

Consequently, the Center maintains substantive research-based relations with over 25 minority institutions. Also, GSFC engages with several minority student organizations, e.g., National Society of Black Engineers, Society of Hispanic Professional Engineers, and the American Indian Science and Engineering Society through their national conferences. Such efforts have demonstrated GSFC's commitment to long-term relationships with such organizations. The leadership of the Center has endorsed these efforts as a priority to ensure that diversity in our intern programs is a business imperative. The GSFC education community, including the Higher Education Office, the Human Resources Office, and the Equal Opportunity Office pursues this vigorously.

### "Experimenting on Humans" Vic Teplitz

We have a number of new programs, some in 2005 and others planned for 2006 trials. With every new program, we are grateful to the people on whom we try them out. In semi-logical order, they include:

- Teachers' Advanced Study Institute (TASI) is a two-week program for high school teachers on using "inquiry-based" teaching for space science (watch our web site [<http://university.gsfc.nasa.gov/>] for details). We expect to try it summer, 2006.
- *Eyes on the Sky* lecture series (<http://university.gsfc.nasa.gov/eyesonthesky/>) for high school and college students, as well as the general public (8 lectures celebrating the centennial of Einstein's landmark works of 1905) played to over 100 people, often with standing room only attendance. The year 2006 will more broadly celebrate the conquest of space.
- College Freshman Intern Program (CFIP): 1-2 week introduction to space science, a program Goddard attempted in 2004 and 2005. The lesson learned was that 2 weeks is not enough; it is better to take freshmen into "regular" intern programs as with Robotics just below.
- Robotics: 10-week program for teams of 2 or 3 freshmen led by an advanced robotics student, working on a significant robotics program for a Principal Investigator (PI) at Goddard, Applied Physics Lab, private industry, or the University of Maryland (2005; see web site [<http://university.gsfc.nasa.gov/robotics/project/index.jsp>]). They did really well, and we're eager to see 2006 participants surpass their efforts.
- Bi-generational Teams: Burrell, Fahey, and Halpern have a grant from the Exploration Systems Mission Directorate at NASA HQ to bring faculty-student teams to Goddard, during the summer of 2006, to work on exploration issues (watch our web site [<http://university.gsfc.nasa.gov/>] for details).
- Engineering at Tribal Colleges and Universities (TCUs): Of the 34 TCUs, none (zero, zip, nada) give a bachelor's degree in any kind of engineering. Nall and Bruce Butterworth, Assistant Director of Applied Engineering and Technology Directorate (AETD), have a Director's Discretionary Fund (DDF) project to begin development of courses toward a B.S. degree in engineering at a Montana TCU. It will supplement a full person-year of engineering effort set aside by AETD.
- D.C. Space Grant Consortium Interns: The D.C. Space Grant Consortium has sent 7 students to spend a large part of the fall semester doing research and/or engineering at Goddard. We (and D.C.) are expecting great things from them.
- It was a pleasure to be a sponsor of a graduate fair, held during the summer of 05, by the National Society of Black Engineers, Goddard Chapter. Many graduate schools came; many undergraduate interns and others came. A good and informative time (not to mention the refreshments) was had by all.
- Of potential particular significance, we are probing problems facing women in science at NASA with a lecture series this winter, a workshop next fall, and, subject to the availability of funds, focused research grants following the workshop.



*Eyes on the Sky lecture series*

## Opportunities for Students

### Programs for Native American Students

For several years, Goddard has been developing partnerships designed to increase Native American students' and faculty participation in our Higher Education programs. We currently offer internships through the American Indian Science and Engineering Society (AISES), the North Dakota Association of Tribal Colleges (NDATC) and with Salish Kootenai College. Participants have been from computer science, environmental science, electrical engineering, mechanical engineering, astrophysics, materials science and technological processes.

We very much want to encourage Native American students, both at Tribal Colleges and at other institutions, to apply for a summer internship with Goddard for 2006, and to encourage professors to tell qualified students. There are opportunities for students and faculty, and we are committed to arranging faculty/student teams as requested.

Eligibility and application due dates are on:

<http://www.university.gsfc.nasa.gov>

<http://www.aises.org>

<http://www.ndatc.org>

Contact Ms. Janie Nall at 301-286-0885 or [jane.m.nall@nasa.gov](mailto:jane.m.nall@nasa.gov) for additional information.

## GSFC Office of Higher Education Online System

Since 2002, the Office has offered an online Internet-based venue for students to apply to our programs. During 2002, only applicants to the NASA Academy Program could apply electronically, but in subsequent years, most other internship program applications became accessible online. Like so many other online systems today, capabilities, conveniences and services have evolved to better serve each Higher Education customer.

So you ask.... who are the customers of Higher Education? Simply put, they are the students who apply to our programs, the space R&D community and mentors who receive our students, NASA HQ which reviews our programs, and Space Grant Consortia and other academic institutions who co-sponsor our programs.

The application provides access points for students, principal investigators (PIs) and other mentors, Space Grant co-sponsors and selection committee members who help select student applicants. These access points and subsequent processes have improved each year to the point where today it is seamless, paperless, and accessible from anywhere in the world with Internet access. For the 2006 session, each customer will be directly involved during some segment of the application, review, selection and evaluation processes. Moreover, the application process invites both mentors and students alike to apply.

During October and early November, civil servants or contractors interested in hosting a student intern could submit a request. This was done through the online Mentor's Student Request Form. The form contains three main sections including Mentor, Project and Position sections. The entry describing the project and position are embedded in eligible student applications. Students who apply are instructed to pick their top three projects/positions and write a 300-word essay explaining their interest in the program. After the open application period for students (which ends 1/31/06) the mentors who requested the students will have the opportunity to review applicants who asked to be considered for their project. The Space Grants and programs are also involved. They endorse students selected for each program. All-in-all, it is expected that this new process will result in better matches between students and mentors, and ultimately, inspire more students as the next generation of explorers.

## 2005 NASA Robotics Internship Program Inaugural Run

The Program piloted at Goddard from June 6 to August 12. The class of 2005 consisted of 19 college freshman and sophomore research associates (RAs) and 7 advanced undergraduate and graduate team leads. The RAs and team leads were selected based on excellence in academic performance, demonstrated prior involvement in robotics and propensity for teamwork. Proposals for team projects were solicited from researchers at GSFC, University of Maryland, College Park, The Johns Hopkins University, The Johns Hopkins Applied Physics Lab, and local industry. Seven proposals were selected based on several criteria, particularly, well-defined end-product with technical deliverables of value.

The seven were:

1. Visual Obstacle Identification Robotics (VOIR)  
Principal Investigators: Dr. Brad Boone, Ms. Ann Darrin (The Johns Hopkins Applied Physics Lab (JHU/APL)), Dr. Bill Heaps (NASA)
2. Development of Advanced Human-Robot Interfaces for CosmoBot (HRIC)  
Principal Investigator: Dr. Corinna Lathan (Anthrotronix Inc.)
3. Computer Vision for ANTS TetWalker (CVAT)  
Principal Investigator: Dr. Jacqueline LeMoigne (GSFC)
4. Modeling of Tetrahedral-based Robotics (MTRS)  
Principal Investigators: Dr. Steven A. Curtis, Dr. Michael Desch, Mr. Walt Truskowski (GSFC)
5. Virtual Feel Robotic Servicing (VFRS)  
Principal Investigator: Mr. John Vranish
6. Development of Robotics Rover Prototypes to Assist Astronauts (RRPA)  
Principal Investigator: Dr. David Akin (University of Maryland, College Park)
7. Adaptive Sensor Fleet (ASF)  
Principal Investigator: Ms. Barbara Medina (GSFC)

Three field trips were taken during the summer to expose the robotics cohort to the depth and breath of robotics R&D at NASA and academic institutions:

Johnson Space Flight Center, Houston Texas.  
Carnegie Mellon Robotics Institute, Pittsburgh, Pennsylvania.

MIT Computer and Artificial Intelligence Laboratory, Boston, Massachusetts.

There were four public lectures—most with standing room only:

1. The Challenges and Excitement of Space Robotics: Exploring the Solar System  
Dr. Paul Schenker, Manager, Robotic Space Exploration Technologies Program, NASA Jet Propulsion Laboratory
2. Testing Space Robots on Earth  
Dr. Butler Hine, Director, Exploration Office  
NASA Ames Research Center
3. Intelligent Robots: R2-D2 to Spirit, Opportunity and Beyond  
Dr. Vijay Kumar, UPS Foundation Professor, University of Pennsylvania
4. Learning From Nature to Build Robots That Can See and Walk  
Dr. Ralph Etienne-Cummings, Computational Sensory-Motor Systems Lab  
Department of Electrical and Computer Engineering  
The Johns Hopkins University

Seven guests met with the students, had dinner, and provided a brief informal presentation about their involvement with robotics:

- Anngienetta Johnson (NASA Headquarters (HQ))
- Orlando Figueroa (NASA HQ then, Director of Applied Engineering and Technology Directorate at Goddard now)
- Dave Lavery (NASA HQ)
- Ken Hinkle (GSFC)
- Vladimir Lumelsky (GSFC)
- Frank Cepollina (GSFC)
- John Vranish (GSFC)

The program was made possible by funding from NASA Headquarters Science Mission Directorate, Goddard Hubble Space Telescope Development Project, Goddard Center Director's Discretionary Fund, and some participating Space Grant Consortia and projects. A measure of its success is that other Centers are interested in running it as well.

*Robotics Internship Closing Ceremony*



## Dr. Kathie Olsen Inspires Crowd

*By Teresa Coda*

On November 10, Dr. Kathie Olsen gave a lecture entitled, "The Immortality Factor" in the Goddard Space Flight Visitor's Center. As the former NASA chief scientist and current NSF Deputy Director, Dr. Olsen had much insightful advice to give. Her talk was filled with interesting facts, humorous observations and inspirational words.

Dr. Olsen began her lecture with a series of slides showing various cartoon brains. These illustrations gave a humorous look into the undergraduate student, graduate student, engineer, doctor, and other science related professional's brains. As the brains got older, their obsession with free food decreased, but their dependence on coffee increased. As Dr. Olsen described each of the illustrations, she explained the various jobs that she has held, and how she has obtained the position that she holds today.

Dr. Olsen encouraged the students in the audience to consider a major in science, even if science is not necessarily their passion or forte. She recalled science being her least favorite subject when she was in high school. It was not until she had a fantastic professor in college that she realized how much she enjoyed and excelled in science. Even if students do not necessarily hope to pursue a career as a scientist, majoring in science can open the door to many different careers, including law, politics, teaching and

writing. In fact, both Herbert Hoover and Colin Powell were geology majors!

As a brain scientist, Dr. Olsen also spoke about gender differences, stating that there are "more individual differences than gender differences". She informed the audience that many professional women are paid less than men who are doing the same work, but she emphasized the fact that it does not have to be that way. "Ask for more," she encouraged.

Dr. Olsen finished her lecture with some words of advice. She said that in order to succeed in any career, especially science, one must do three things:

1. Keep a high moral ground.
2. Keep a sense of humor.
3. Keep answering the phone! You never know when the person on the other line may be offering the perfect job opportunity.

Dr. Olsen's final words were a quote by Dr. Ed Weiler, "The universe is boundless and the discoveries unlimited." Dr. Olsen was a motivational and inspiring speaker; she proves that diligence and ambition result in success.

*Teresa Coda is a junior at Greencastle-Antrim High School, where she is currently enrolled in a Women In Science class. Teresa hopes to be a journalist in the future.*

*From left to right: Teresa Coda, Katie Buhrman, Tara Clopper, and Dr. Kathie Olsen*



## Bi-Generational Exploration Systems Mission Directorate Teams

2006 will see a new summer program of teams of faculty, students and NASA personnel. The purpose is to advance Exploration Systems Mission Directorate (ESMD) research and development priorities with fellowships and internships at GSFC and visits to universities during the academic year. Eight faculty/student teams will be nationally recruited for ten summer weeks at Goddard and integrated into ESMD R&D and GSFC related activities.

If this pilot is successful, it can be replicated across NASA. Research emphasis areas reflecting GSFC's core competencies of particular relevance to ESMD include: (a) communi-

cations and navigation, (b) robotics and in-space servicing, (c) large-scale information systems (d) space weather prediction systems, and (e) constellations of satellites.

Faculty will be chosen for research expertise, intellectual promise, and interest in ESMD goals. Special efforts will be

made to recruit diverse partners. Experience with faculty fellowship programs has shown that there are significant numbers of faculty at minority-serving institutions and non-research oriented schools with special research skills relevant to NASA ESMD research who are anxious to involve their students in research.

Each faculty member will bring one or more students. Applications will contain research goals. The research teams will report on how they achieve or surpass these. Surveys will be developed to measure quantifiable outcomes and participant satisfaction. The Project Lead will work with the research teams to continue the partnerships into the academic year and to identify K-12 educational activities where the teams can contribute. NASA colleagues will visit the universities in the academic year.

Follow on is a central issue for fellowship programs. Faculty/student programs such as this one have the potential for longer involvement coupled with a more mature and sophisticated intellectual exchange and enhanced research progress than separate faculty or student programs alone. By combining faculty/student summer internships and paying attention to academic year follow-on, we hope to reap rich benefits. This program is of building teams of faculty, student interns and NASA mentors. It will provide an intense introduction to ESMD and NASA R&D, and build links between NASA and the universities.



*continued from page 1*

SIP students must be enrolled as full-time sophomore, junior, senior undergraduates, or at the early graduate level in an accredited college or university. Students must also possess a minimum grade point average (GPA) of 3.0 or better in Science, Technology, Engineering, and Mathematics (STEM) related courses. Applicants must be US citizens or permanent residents. Students with disabilities are provided reasonable accommodations.

If you are interested in the SIP, please click on the link below to apply (deadline January 31, 2006).  
<http://university.gsfc.nasa.gov>

For more information, please contact the SIP Program Manager:  
Goddard Space Flight Center  
Code 602  
Greenbelt, MD 20771  
(301) 286-8733  
(301) 286-1610 - fax

## Harriett G. Jenkins Pre-Doctoral Fellowship Program (JPFP)

From research and training to mentoring and networking, the JPFP opens new worlds of opportunity for tomorrow's scientific pioneers.

The ultimate goal is to increase the U.S. talent pool by developing a more inclusive, multicultural, and sustainable STEM workforce. Highlights of the JPFP include a Mentor-Protégé Initiative, Fellows Orientation, a Technical Exchange Symposium, and the Mini Research Award Program. Stipends, travel allowances and tuition offsets are included.

Eligibility requirements:

- Applicants must be citizens of the United States.
- Applicants must be members of an underrepresented group that includes women, minorities and disabled persons.
- Applicants must be applying for or be within the first three years of a full-time, graduate program within a STEM discipline. Persons who have advanced to doctoral candidacy are ineligible.
- Applicants must have and maintain a minimum grade point average of 3.00 on a 4.00 scale.
- Applicants may not concurrently participate in any other federally funded fellowship or scholarship program.
- Application deadline: February 1, 2006

For more information, please contact the JPFP Program Manager:

Harriett G. Jenkins Pre-Doctoral Fellowship Program  
2750 Prosperity Avenue, Suite 600, Fairfax, Virginia 22031  
URL: [www.uncfsp.org](http://www.uncfsp.org)

## Graduate Student Researchers Program

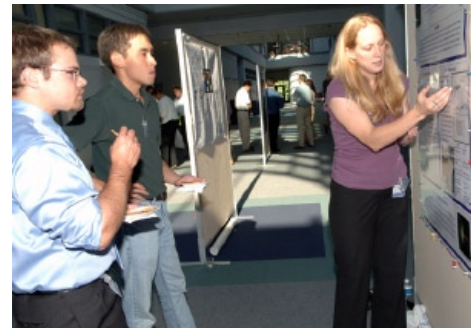
The Graduate Student Researchers Program (GSRP) provides science and engineering students with fellowship support on research related to NASA mission areas. GSRP is NASA-wide with 1-year grants for \$24K renewable for three years.

At Goddard, graduate students are paired with mentors to work on projects of mutual interest to the student and the Center. GSRP Fellows are in residence at their home institution but spend a mutually agreed upon time in research at the Goddard laboratories during the year.

Goddard has approximately 35 fellows each year from various universities around the country to include: Penn State University, Cornell University, University of Alabama, Michigan State University, Kansas State University, University of Maryland, University of Colorado, University of Arizona, Stanford University, etc. Students do research in the areas of Space Science, Earth Science and Technology development at GSFC.

The Goddard GSRP Symposium, held annually in September, allows students to spend time with their mentor, share research findings, network, and get updated on the Center's technical climate. The 2005 luncheon keynote speaker was Goddard's Chief Scientist, Dr. James Garvin. He gave an enlightening talk about the Moon to Mars space exploration vision. During the 2005 GSRP Symposium, third-year fellows gave oral presentations on their research and a poster session was held for the Goddard community. Second-year, and a few first-year fellows presented posters.

Students from the NASA Academy and Student Intern Program have become GSRP students. After their Ph.D.'s, GSRP students have "pipelined" to the Resident Research Associateship (postdoctoral) Program and have also transitioned to civil servant positions.



*2005 GSRP symposium poster session*



## Minority Recruitment Initiative

The success of the 2004-2005 NASA Academy Alumni Association (NAAA) Minority Recruitment and Educational-Outreach activities has motivated the NAAA to initiate an active diversity orientation campaign to further promote NASA's summer internships and research programs.

The main purpose of this all-volunteer initiative is to assist the National Space Grant College and Fellowship Program with advertising, orientation, and recruitment plans. This effort seeks to increase the number of minority applicants interested in pursuing research and non-research opportunities at NASA-GSFC by:

1. Consolidating the Office of Higher Education's internship and fellowship recruitment efforts into a single orientation and recruitment initiative that will focus on the qualities and advantages of all programs.
2. Focusing the NAAA's recruitment and orientation campaign towards Historic Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), as well as colleges and universities where current NAAA alumni are pursuing their graduate studies.
3. Approximately 20 volunteers of this committee will actively participate in national conferences sponsored by professional minority organizations and societies (e.g., NSBE, SHPE, TAME, ADAMI, NACME, HACU and AISES). This will occur between October and December 2005. Other volunteers will also make pre-planned site visits to minority serving academic institutions.

**Seven internship programs are offered through the Office of Higher Education. They include:**

1. NASA Academy
2. Student Internship Program (SIP)
3. NASA Robotics Academy
4. Independent Verification & Validation Internship Program
5. NASA/Johns Hopkins Applied Physics Laboratory Student Internship Program (APL)
6. NASA Summer Aerospace Workforce Development Research Internship Program (SAWDRIP)
7. Summer Institute in Engineering and Computer Application (SIECA)

**Improvements impacting each of these programs include:**

Housing will be provided for most student participants for the first time ever. They will be in University of Maryland, College Park, fraternity/sorority houses.



*Minority Recruitment at ADAMI in Puerto Rico*

Faculty deans are also provided for most programs. These serve as coaches to student mentors and academic advisors to the student interns. The deans ensure that both interns and their assigned mentors have a great summer experience. Beginning next summer, most programs will hire advanced students to serve as program staff. Staff are responsible for making sure all logistical, administrative and housing arrangements go smoothly. Lastly, we have created an online student request form for prospective mentors to submit a request for a student. The request form asks for desired discipline, level of student (or faculty), and a detailed position description of what the student will do if matched with this mentor. These position descriptions will, in turn, be embedded in the appropriate program applications. Applicants pick the top three to which they would like to be assigned.

### Opportunities for Faculty

#### **NASA Administrator's Fellowship Program**

We are now soliciting applications for the 2006 NASA Administrator's Fellowship Program (NAFP), administered by the United Negro College Fund Special Programs (UNCFSP) Corporation. Designed to enhance the professional development of NASA employees and the Science, Technology, Engineering, and Mathematics (STEM) faculty of Minority Institutions (MIs), the program seeks to increase the ability of the participating MIs to respond to NASA's overall research, development, and education mission. In order to meet these objectives, the NAFP is seeking applications from NASA career employees and STEM faculty of minority institutions. The application deadline for the 2006 NAFP Competition is January 20, 2006 (<http://www.uncfsp.org/fac.aspx>).

## Higher Education Staff Update

Mrs. LaVon Jennings left the Higher Education Office in December, relocating to Alabama. Mrs. Jennings joined the Office in 2003 as Program Support Specialist and has made many valuable contributions and enhancements to our programs. Mrs. Jenkins ably managed the Jenkins Pre-Doctoral Fellowship Program and the Strategic Preparedness in Advancing Careers in Engineering Program. Additionally, she conducted an eleven-year program survey of Goddard's Graduate Student Researchers Program participants to determine NASA and NASA-related professional career paths. The survey results are available upon request. Our gratitude is extended to Mrs. Jennings for her dedication, professionalism, and team spirit. We wish her well in this new chapter of her life.

The Office welcomes Dr. Joseph Dolan, Astrophysicist in the Exploration of the Universe Division. Dr. Dolan will support the postdoctoral program as well as serve as dean to our student programs. His field of expertise is the end states of stellar evolution—neutron stars and black holes.

Dr. Dolan earned a bachelor's degree in Physics from St. Bonaventure University, a Master's in Astronomy from Harvard, and a PhD in Astrophysics from Harvard. He served on the faculty at Case Western Reserve University and has spent sabbatical years on the faculty at Stanford and San Diego State University. He also occasionally teaches a course at the College of Notre Dame in Baltimore.

Dr. Dolan was co-investigator for the High Speed Photometer on HST, the High Energy X-Ray Spectrometer on OSO-8, and the HIPPARCOS astrometric satellite. He has also done ground based observing of the optical counterparts of X-ray sources with telescopes as large as 4.7 m.

While currently working on an RXTE project observing black holes and an INTEGRAL project looking for pulsars in the gamma-ray region, Dolan is also involved in the GLAST and Stellar Imager projects.

This is not Dolan's first association with the Higher Education Office. He has been both an NRC Fellow and NRC advisor at Goddard.

### Goddard's Higher Education Outlook

Managing Editor Mablelene Burrell

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